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BOOK REVIEW

Alexander McNeil, Rüdiger Frey, Paul Embrechts (2005): "Quantitative Risk Management", Princeton Series in Finance, $79.50.-.

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The importance of financial risk management encounters increasing awareness in the corporate world today. Profound knowledge of stochastics and sophisticated financial modeling techniques have become essential to risk managers. The recent textbook "Quantitative Risk Management" by Alexander McNeil, Rüdiger Frey and Paul Embrechts provides a far-reaching, yet easily accessible compendium from core material to state-of-the-art tools for risk management problems. Its major focus is on the aggregation of different risk sources as well as capital allocation, which is currently a major topic for practitioners and regulators as well. McNeil, Frey and Embrechts set out with the history of risk management including an interestingly edited discussion of the Basle I framework and its major fallacies which motivated the formulation of the Basle II accord. The successive chapter 2 recapitulates widely established risk factor models as well as basic measures like Value-of-Risk and Expected Shortfall. The subsequent discussion of their pitfalls as well as their implicit assumptions generates the motivation for the development of more profound risk management models wich are discussed in the remainder of "Quantitative Risk Management". Chapter 3 familiarizes the reader with foundations in multivariate risk modelling. The authors spend an exclusive section in highlighting the properties of Gaussian as well as Student-t distributions which constitute the implicit distributional assumptions of standard risk models. This endows the reader with a profound analytical understanding of the abilities and failures of widely establishes risk management techniques. The subsequent chapter 4 presents the fundamentals of time series analysis including the standard GARCH framework, as well as its multi-dimensional counterpart. In recent

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years, the notion of copulae has gained the attention of financial risk managers. Therefore, chapter 5 is completely devoted to the main fallacies of standard correlation coefficient in the presence of non-Gaussian or Student-*t* distributions. The successive introduction into copula theory seems a promising way to avoid these problems and builds a major theoretical foundation for the understanding of later chapters. The discussion is accompanied by the definition of dependence concepts directly related to copulae, like tail dependence. An even deeper insight into the pitfalls of standard risk management tools at the presence of Normal distributions is gained in the following chapter 6. It is set out by the definition of coherency and dicusses the prerequisites of Artzner′s famous sub-additivity property which also constitutes the theoretical foundation of regulation frameworks like the Basle accord. Possible solutions to the therefrom arising risk capital allocation problem can perhaps be found in extreme value theory wich is introduced in chapter 7. It comprises the depiction of basic models like the famous POT as well as more sophisticated applications using copula theory. The remainder of the textbook is devoted to the management of credit risk portfolios. Chapter 8 introduces core concepts like structural models of default. Here, basic theoretical foundations like the Merton model are covered in an extremely suitable and intuitive manner. Its extensions and more practical frameworks like the widely-implemented CreditRisk+ are covered in the successive sections. Their dynamic counterparts are introduced in chapter 9. The textbook concludes with an interesting discussion of modeling approaches for operational risk and insurance analytics which have become a prominent part of the current discussion surrounding the Basle II accord.

"Quantitative Risk Management" provides an easily accessible textbook with a broad coverage of topics. The authors define their target audience as advanced undergraduate or graduate students (about first half of the text) as well as professionals from the financial industry (second part). Indeed, it requires knowledge of probability and statistics only at an undergraduate level. The prerequisites for the understanding of more sophisticated risk management tools are introduced in the first five chapters. Therefore, the book can serve as an excellent tool for self-study. A bit missing seem questions and problem sets for the different tools in order to reach the status of an excellent textbook for students. Yet, numerous illustrative examples enable the reader to gain deeper insights into the properties and pitfalls of the outlined concepts. Every section is concluded by additional notes and comments which encourage further reading.

McNeil, Frey and Embrechts prove that texts on advanced risk management tools can be presented in a highly intuitive manner. Their work can become *the* textbook for undergraduate studies in its field. Even experienced practitioners will find new results and higly valuable risk management techniques.